

Remarks:

Claim 41-49, 51-64, 66-82, and 84-95 remain for consideration in this application. Claims 41, 53, and 71 have been amended. Claim 95 is newly added.

Turning now to the prior art rejections, the Examiner has rejected each of independent claims 41, 53, and 71 as being anticipated by either U.S. Patent No. 6,252,030 to Zank et al. or U.S. Patent No. 5,484,867 to Lichtenhan et al. The inventive composition of the present application is different from the compositions of the '030 and '867 references in that the polyhedral oligomeric silsesquioxane must include an alcohol functionality in order for the constituent to undergo cross-linking. To call out this feature, independent claims 41, 53, and 71 have been amended to recite that the polyhedral oligomeric silsesquioxane includes an alcohol functionality. Support for this amendment can be found on page 5, lines 11-14 of the Application.

The '030 patent does not teach or suggest a polyhedral oligomeric silsesquioxane having an alcohol functionality as recited in these claims. In paragraph 5 of the office action, the Examiner stated that Formula 1 in the '030 reference "corresponds to the formula in claim 42 wherein R^3 is hydrogen." It is clear from the structure shown in the '030 reference that Formula I does not possess an alcohol functionality because every corner of the structure instead contains an SiH group. Moreover, the '030 reference does not mention the use of any group other than a SiH group on the corner of the Formula I structure in the specification. Therefore, Applicants submit that amended claims 41, 53, and 71 are not anticipated by the '030 patent.

Furthermore, claims 41, 53, and 71 are not obvious in view of the '030 reference. One inquiry to be made in rendering an obviousness determination, is to determine the scope and content

of the prior art. A determination of the scope and content of the prior art involves distinguishing analogous art from non-analogous art. *See, In re Clay*, 966 F.2d 656, 658, 23 U.S.P.Q.2d 1058 (Fed. Cir. 1992). Only analogous art should be used when making an obviousness determination. To be considered analogous art, a reference must satisfy one of two criteria. *Id.* at 659-59. First, a reference is considered analogous if it is within the same field of endeavor as the claimed invention, regardless of the problem addressed. *Id.* Alternatively, even if a reference is not within the inventor's field of endeavor, the reference may still be analogous if it is reasonably pertinent to the particular problem with which the inventor is involved. *Id.* That is, a reference is analogous art if "it is one which, because of the matter with which it deals, logically would have commended itself to [the] inventor's attention in considering his problem." *Id.*

In considering the first criterion, it is clear that the '030 reference is not within the same field of endeavor as the claimed invention. That is, the '030 reference is concerned with creating polymers with improved electrical insulation properties. These polymers are used to provide heat resistance and insulation for semiconductors, insulator materials for motors and transformers, paints, and primers. See Col. 1, lines 10-19. The present invention is concerned with forming a protective layer for etching steps in microlithographic processing, which is not the same field of endeavor as the '030 field of endeavor.

The next criterion to consider in determining whether the '030 reference is analogous art is whether that reference is reasonably pertinent to the problem that the inventors of the present claims were addressing. This criterion is also not met by the '030 reference. The claimed invention is concerned with the problems associated with middle or protective layers in trilayer resist processes.

The protective layer must be easy to apply, adhere to adjacent layers, have outstanding etch selectivities to adjacent layers, and be insoluble in solvents present in those adjacent layers. The '030 reference is not at all pertinent to this problem. Protecting against heat and providing insulation for the above listed electronic materials are entirely different problems. Thus, neither of the pertinent criteria is met by the '030 reference. It is respectfully submitted that the '030 reference is non-analogous art, and that it is improper to use this reference as part of an obviousness rejection.

Even if the Examiner still believes this to be analogous art in spite of the foregoing arguments, one of ordinary skill in the art would not find the claimed differences to be obvious. That is, one of ordinary skill in the microelectronic art would not be motivated to look to a reference concerned with providing heat and insulation protection, and modify the teachings of the reference to use its polymer as a middle layer in a microelectronic structure. Specifically, there is no motivation to have an alcohol group instead of the SiH group on the silsesquioxane because the cross-linker in the '030 patent works only by reacting with the SiH group on the silsesquioxane. In the office action, the Examiner argued that the '030 patent teaches reacting a polyhedral oligomeric silsesquioxane compound with a cross-linking agent. In referencing a cross-linker, the Examiner points to a divinyl compound (Formula 2) that reacts with the SiH group on the silsesquioxane. The cross-linking agent in the present invention works in a different. Here, the Applicants use a cross-linker to thermally react with the alcohol group on the polyhedral oligomeric silsesquioxane. After cross-linking, the composition is different from the composition in the '030 patent in that the claimed invention is insoluble in the solvents present in layers (e.g., photoresists) typically adjacent the inventive layer in microlithographic processing. In light of the foregoing, it is respectfully submitted


that the presence of an alcohol functionality on the polyhedral oligomeric silsesquioxane would not be obvious in view of the teachings of the '030 reference.

In addition to the '030 reference, claims 41, 53, and 71 are also patentable over the '867 reference. For this rejection, the Examiner relied on the polyhedral oligomeric silsesquioxane structure in Formula 2 of the '867 reference. Col. 2, lines 43-53. As with the '030 reference, the '867 reference does not teach the structure in Formula 2 as having an alcohol functionality, and therefore this reference does not anticipate claims 41, 53, and 71.

Claims 41, 53, and 71 are also not obvious in view of the '867 reference. The reference states that silsesquioxane “polymers, because of their highly crosslinked nature, have been difficult to handle, purify, and characterize. Polysilsesquioxanes also exhibit a well-known propensity to form insoluble, intractable gels.” Col. 1, lines 38-41. When discussing prior art, the '867 reference discusses using its polymer as a photoresist. Because the '867 patent is concerned with improving solubility and discusses using its polymer for a photoresist composition, the polymer would not be substantially insoluble in a photoresist solvent but rather would be highly soluble in a photoresist solvent as all photoresist polymers must be. This differs from the claimed invention in that the composition in claims 41, 53, and 71 would be insoluble as discussed above in regards to the '030 reference. One of ordinary skill in the art would not modify the '867 composition to include alcohol groups as photoresists must be soluble in photoresist solvents, or they could not be patterned. It is respectfully submitted that all rejections predicated upon the '867 patent should be withdrawn.

It is believed that no further issues should exist with the present application, and that a Notice of Allowance is in order. Any additional fee due in conjunction with this amendment should be applied against our Deposit Account No. 19-0522.

Respectfully submitted,

By 

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